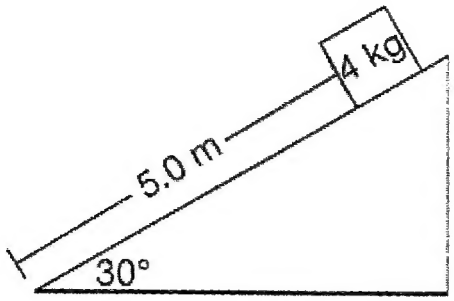
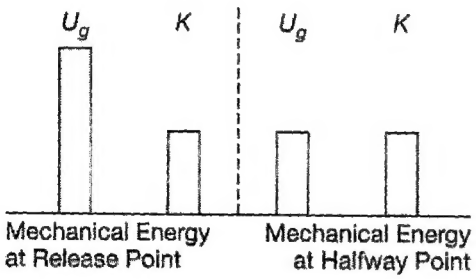
Conservation of Energy AP Question 1--



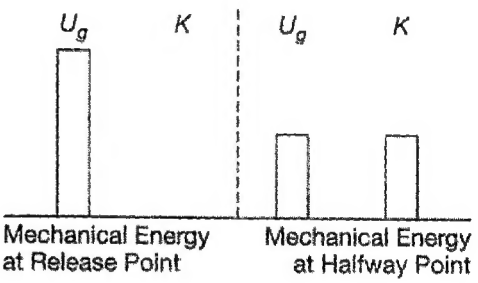
1) A 4 kg block is pushed up an incline that makes a 30° angle with the horizontal, as shown in the figure. Once the block is pushed a distance of d=5.0 m up the incline, the block remains at rest. What is the approximate change in the gravitational potential energy of the block-Earth system when the block is held at rest compared to its original location at the bottom of the incline?

a) 0 J b) 100 J c) 173 J d) 200 J

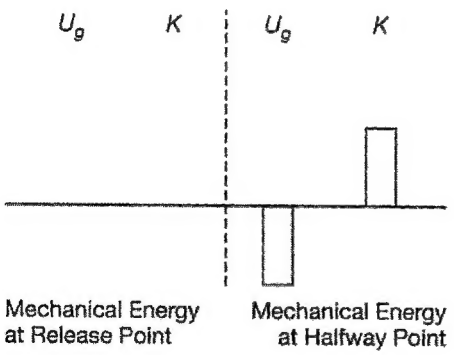
2) An object initially at rest falls from a height H until it reaches the ground. Two of the following energy bar charts represent the kinetic energy K and gravitational potential energy Ug of the object-Earth system at two positions. The first position is when the object is initially released, and the second position is when the object is halfway between its release point and the ground. Which two charts could represent the mechanical energy of the object-Earth system? Select two answers.



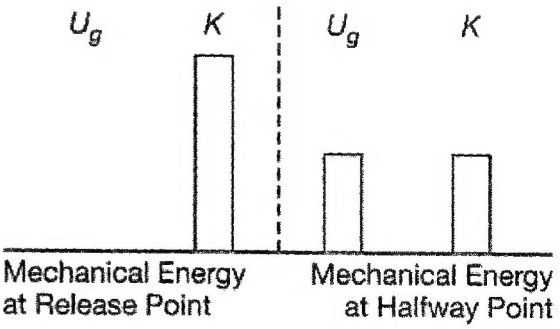
b)



a)

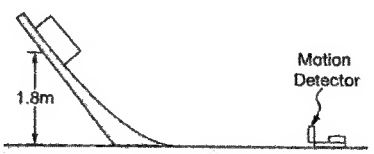


c)



d)

3)



Conservation of Energy AP Question 1-4

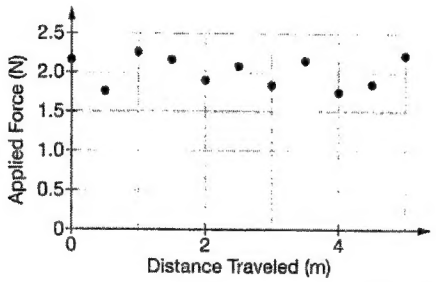
The surface of an incline is coated with an experimental substance that is intended to reduce the frictional force between a block and the surface of the incline. A 2 kg block is placed at the top of the incline at a height of 1.8 m, as shown in the figure. After the block is released from rest, the block slides down the incline and a motion detector at the bottom of the incline measures the block's speed as 5.8ms after the block is no longer on the incline. Which of the following claims is correct about the experimental substance?

a) The experimental substance reduced all the frictional force because all the gravitational potential energy of the Earth-block system at the top of the incline was converted into the kinetic energy of the block at the bottom of the incline.

(b) The experimental substance did not reduce all the frictional force because some of the gravitational potential energy of the Earth-block system at the top of the incline was converted into nonmechanical energy.

c) The effectiveness of the experimental substance cannot be determined because the speed of the block at the bottom of the inline, as measured by the motion detector, indicates that the block has more energy at this location than the Earth-block system had at the top of the incline.

d) The effectiveness of the experimental substance cannot be determined without knowing the magnitude of the frictional force between the block and the incline before and after the experimental substance was applied to the incline.



4) An experiment is conducted such that an applied force is exerted on a 5kg object as it travels across a horizontal surface in which frictional forces are NOT considered to be negligible. A graph of the net force exerted on the object as a function of the object's distance traveled is shown. How could a student use the graph to determine the net work done on the object?

a) Multiply the average value of the applied force by the total distance the object traveled.

b) Multiply the slope of the best fit line by the total distance the object traveled.

c) Calculate the area bound by the line of best fit and the horizontal axis from 0m to 5m.

(d) There is not enough information that is known or can be obtained from the graph to determine the net work done on the object.